Flip IT!

Flipped Classroom
in the European Vocational Education

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State-of-art national report

Spain

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1. Country education and vocational training system

1.1. Background of the Educational system (legal education) in the country

Currently in Spain there are two VET options:

- VET diploma developed and implemented by the MECD (Ministry of Education, Culture and Sport)
- Professional certificates (RNCP) provided by the MEYSS (Ministry of Employment and Social Security), as part of the National Employment System and continuous vocational education and training (CVET)

In this report we will focus on VET within the education system. All those VET programmes, at basic, intermediate or higher levels, have a minimum of two academic years (2,000 teaching hours).

As shown in Figure 1, education begins at pre-school (not compulsory), and continues through to primary education (first stage of compulsory education) from 6 to 12 years old. Secondary education lasts 4 years, until the age of 16. Students who complete After completing secondary compulsory education obtain the lower compulsory secondary education certificate (Graduado en Educacion Secundaria Obligatoria (ESO) ISCED[1] 2) . This certificate is a requirement to access upper secondary education, both the general Baccalaureate (Bachillerato ISCED 3), and the vocational option (Intermediate VET diploma programmes ISCED 3).

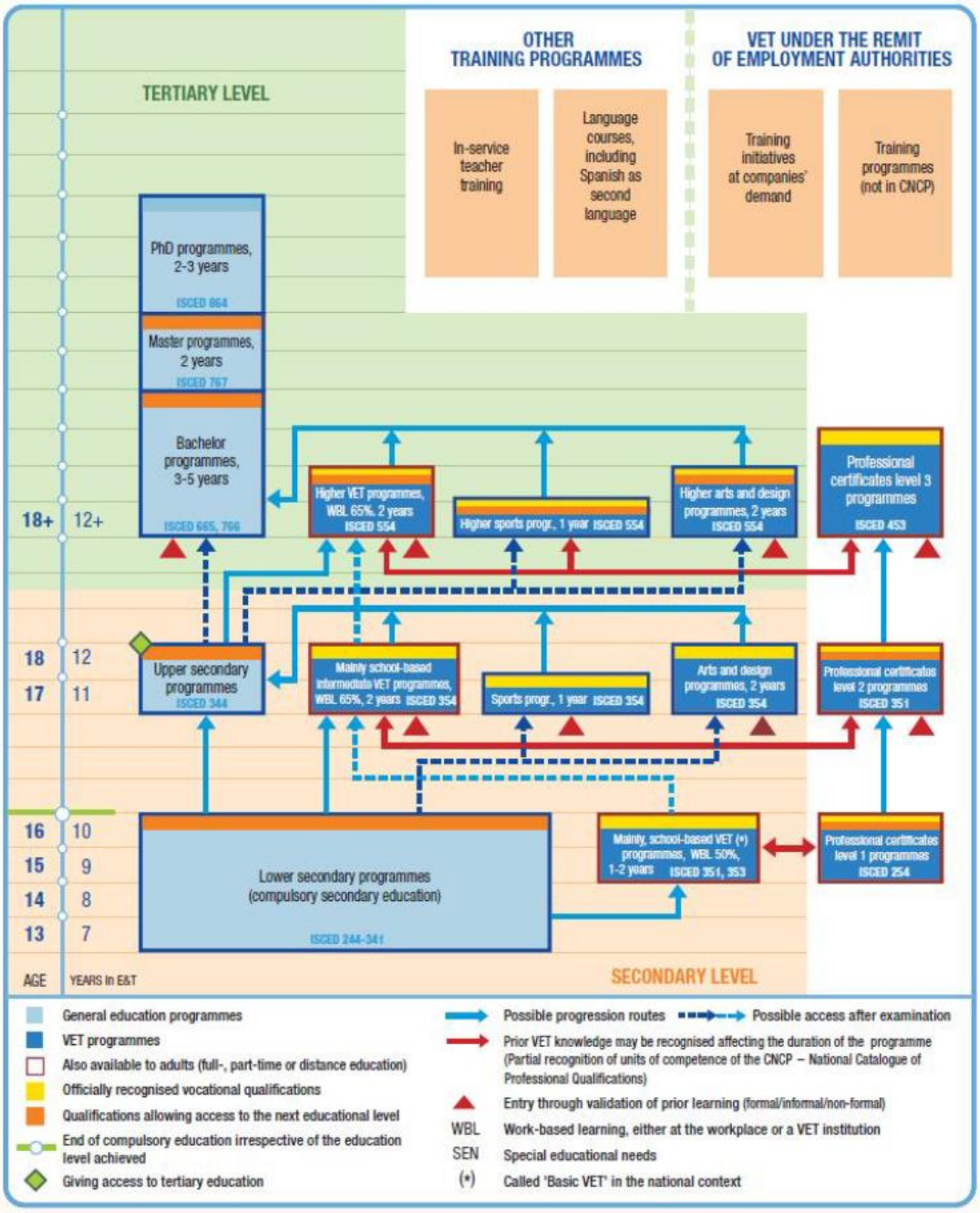
Regarding VET, according to the LOMCE (Spanish acronym for Organic Law on Education Quality Improvement) approved on December 2013, the new Basic VET programme replaces the Initial Vocational Training Programmes (PCPIs). Basic VET includes 21 different diploma (official qualifications) right now. The target group for this training level is that of students aged among 15 and 17 years, having completed their third year of Compulsory Secondary Education (exceptionally the second one) and without option to complete secondary compulsory education. Basic VET is an alternative to continue studying since it gives access to VET intermediate level.

In 2014, almost all VET Diploma programmes have been updated to the requirements of the productive sectors. Some new Diploma programmes have been introduced, including the current Catalogue of VET Diploma programmes currently 175 Diplomas.

For adults who lack the basic secondary education qualification, there are specifically designed 'Adult Education' programmes that lead to a primary and lower and upper secondary education certification.

[1] UNESCO International Standard Classification of Education

1.2. Diagram of the country education and vocational training system.



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2. General framework of Technology and Educational Innovation in the country

2.1. State program for initiatives

In the last ten years, two important educational programs related to the incorporation of digital technology to the school have been implemented in Spain, through the central Government:

Programa Internet en el Aula (Internet in the Classroom Program): It was carried out to provide basic information and communication infrastructure to all the schools in Spain. This program, which was developed with European Regional Development Fund (ERDF), meant a 453.5 million euro investment. Their main actions have been the following:

- Provision of computer equipment and infrastructure for Internet access to public schools: video, digital, interactive, laptops, tablet PC, etc.
- Promoting the development, dissemination and use of digital teaching materials.
- Training of teachers and advisers in teacher training.
- Revitalization of the network of Advanced centers in the use of ICT.
- Create a social network for teachers as a continuation of the actions developed in the virtual Congress Internet in the classroom.
- Monitoring and evaluation of all the undertaken actions for the implementation of information society in schools.

Programa Escuela 2.0 (School 2.0 Program): this initiative was promoted by the Spanish Government from 2009 to 2012, with a budget of 200 million euros. This program affected schools sustained with public funds, specifically the fifth and sixth courses of Primary Education (10 to 12 year olds) and the first and second year of Compulsory Secondary Education (12 to 14 year olds) (Area, Sanabria and Vega, 2013). The school 2.0 program was aimed to promote the digital competence in the classroom through the following areas of intervention:

- Digital classrooms. To provide ICT resources to students and schools. Laptops for students and faculty, and digital classrooms.
- To secure Internet connectivity and interconnectivity within the classroom.
- To promote training teachers both in technological and methodological and social aspects regarding the integration of these resources in their teaching practice.
- To generate and facilitate access to digital educational materials adapted to curricular designs both for teachers and for the students and their families.
- To engage students and their families in the acquisition, custody and use of these resources.

As a result of the economic crisis, Internet in the Classroom Program was cancelled in 2012. There is currently no policy or alternative program aimed at boosting coordinated processes to integrate ICT in the Spanish school system. However, teacher training is promoted from the Boards of Education in the autonomous communities through websites or online resources. Another trend is to use tablets in the classroom, wireless technology to access Internet in schools, as well as the creation of educational spaces with resources in the cloud. On the other hand, the BYOD (Bring Your Own Device) model is being introduced for access to technologies (Area et al.; 2014).

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2.2. Technology-related teacher training programs

Every year the National Institute of Educational Technology and Teacher Training, belonging to the Ministry of education, launches a call for teacher training. This call is intended to teachers (and advisers) of non-university levels of education centers sustained with public funds. This call is inserted within the Framework of Teachers Professional Development, whose main objective is to increase and improve the digital competence of teachers.

Educational technology courses offered during 2015 are as follows: Tutors for network training; Personal Training Environment: Network learning; Mobile learning and augmented reality; Education Portfolio as instrument of learning; education connected in real time; Digital Story telling; Multiple literacies; Creation of open educational resources, Flipped classroom, From spectator to programmer. Training is performed on the training platform Moodle from the National Institute of Educational Technology and Teacher Training.

Flipped Classroom course lasts 70 hours and is focused on the analysis of the application of this model to the context of Primary and Secondary education. Moreover it approaches the advantages of its development as well as the issues or problems that we can find when it comes to putting it into practice. When flipping the classroom and the learning processes, emphasis is placed in the "student learning" rather than in the "teaching of the teacher". In addition, tools and resources for the development of the Flipped Classroom model are addressed.

2.3. Research groups and networks related to education and technology

Within the framework of Internet in the Classroom Program, in 2004, the network of advanced educational centers in the use of ICT (redTIC) was created. This is a network composed of 66 schools, aimed to collaborate in the integration of experiences and initiatives in the use of ICT within the teaching and learning processes. Likewise this network promotes the creation of spaces for the exchange of experiences, resources and best practices for ICT in education.

In Spanish universities there exist different research groups related to the field of educational technology, such as the Laboratory of Education and New Technologies at Universidad de La Laguna, the Research Group of Educational Technology at Universidad de Murcia; Research and Innovation Group in Educational Technology from Universidad de Salamanca; Groups of Educational Technology from Universidad de Sevilla and Universitat de les Illes Balears; or the Laboratory of Interactive media in Universidad de Barcelona. Likewise, it can be noted the creation of *Red Universitaria de Tecnología Educativa* (University Network for Educational Technology) in 2008, to which different research groups are affiliated. It is an academic non-profit association composed of teachers and researchers interested in promoting the application of ICT in education.

2.4. Educational innovation projects and technology

In the in the last ten years, From the Ministry of Education (through the National Institute of Educational Technology) and from the Ministry of Industry, Tourism and Trade (through the enterprise public entity Red.es) have been promoted projects related to technological innovation in teaching. The following are some of the most relevant:

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- **Good practices 2.0**: from this portal a public virtual space is offered to teachers of any educational level. This portal is intended to collaborate and develop communities of teachers who share resources, experiences and good practices 2.0.
- **Educ@conTIC**: portal where teachers can find an educational blog as well as a catalogue of educational digital resources to introduce ICT in the classroom.
- **Simulators for training**: the Spanish Ministry of education is developing educational interactive and multimedia resources, published in its educational portal. Among them, there have been developed a series of simulators for different families of Vocational Training.
- **Technological Observatory**: it is a collaborative space for teachers based on the observation, study and analysis of computer technology (hardware and software) in order to apply it to non-university levels of education. The target group is composed of teachers with an advanced user level, and that have or may have responsibilities in the equipment of its centers, or who usually apply new technologies in their classes.
- **Technical multimedia glossary**: Educational multimedia resource to support Vocational Training, which provides a source of multimedia information organized through digital learning objects. It incorporates an average of 2000 technical words for each professional family, with their corresponding multimedia accessories, translations, etc.
- **Procomún**: open educational resources network, where currently there are a total of 13,673 registered users and 121.244 published resources. Resources are classified by educational stage, subject area and type of resource (photography, multimedia presentation, illustration, Project-based learning, sound effect, exercise or closed problem, masterclass, narrative text, questionnaire, educational game). In the field of Vocational Training there exist 3,331 specific resources, classified by professional families as well as specific virtual communities.
- **Agrega Platform**: A bank of resources or digital educational contents that allows all the educational community (teachers, parents and students) find and create interactive material for their classes, standardized and consistently with the pre-school, primary and secondary education curriculum. Agrega project was winner of the Silver Award in the prestigious IMS Learning Awards 2009.
- **ICT Didactics**: It is the project to development training materials in order to train the educational community in the use and didactic application of ICT. It can be find more than 130 training modules available in all the co-official languages in Spain and for all curricular areas, more than 780 didactic proposals for direct use in the classroom, and 40 simple video tutorials on applications of educational use.

3. Literature review on Flipped classroom

There have been numerous Flipped Learning experiences of Flipped Learning in all levels of education in Spain. The earliest of them dating from 2013, although earlier ones probably have existed only not under the name Flipped Learning (or Flipped Classroom).

One of the first disseminative works on the methodology came from the AIEE (Association of Education Inspectors of Spain) where García-Barrera, A. (2013) introduced the Spanish educational community into the practice and its background.

There are many online resources, success stories, blogs and communities currently available to help instructors willing to flip their classes in Spain.

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Some instructors will upload their content openly on hosting platforms[2], others will create institutional communities using social networks such as the IES Virgen del Castillo that has used Google+ and sites.google.com in its effort to aggregate its history instructor's flipped experiences[3].

Regional communities also exist like the EABE, the Andalusian Meeting of Educational Blogs, that shares a Google+ page with their flipped learning initiatives[4].

The platform www.theflippedclassroom.es, is one of the main aggregators of flipped learning experiences in the Spanish scene. It is managed and coordinated voluntarily by instructors from institutions all around the country[5], who share through the platform their knowledge on the methodology. Most of the platform is dedicated to Secondary education though it presents cases in primary[6] and higher education levels too. The initiative sparks from higher education since the founder and main coordinator is a professor of the Universidad de la Rioja.

Schools such as San Gabriel de Zuera in Zaragoza have tried to emulate the successful flipped-school model of Clintondale in the United States. San Gabriel de Zuera has no official recognition but it has attracted the atention of national and international researchers due to its disposition to a full implementation of the methodology all across its curriculum (Marqués Arias, S.; 2015).

Spanish media have started to echo some of the initiatives from different schools in the country. One of the most recent articles being of January 2016 in a National newspaper: El Diario. Where José Antonio Lucero, an Andalusian Social Sciences high school teacher, was interviewed about the use of the methodology in his class, detailing how it worked for the general public[7].

A study of the literature through January 2016 revealed that there has been little actual research performed on Flipped Learning at any level to the date, both in Spain and internationally. Research on the topic in Spain dates back to 2013. It focuses mainly on higher education since it is the level most researchers have access to, although efforts have been made towards secondary and vocational levels too.

At UEM (Universidad Europea de Madrid) there is a research group that shares their experience through a Google+ community[8]. The same institution has a doctoral dissertation in the works on his research on the effect of flipped learning on long term memory in higher education students. UEM set flipped learning as one of the main pedagogical tools its instructors were to use so much of the research found in Spain has been developed by UEM staff and published through its annual innovation conference: JIIU.

Other Spanish institutions have implemented flipped learning outside regular classes as part of a tutoring initiative. This started in the UNED (the Spanish public long distance university) (Vaqueiro

[2] Iñaki Fernández (2015). https://www.educanon.com/public/1409/13250
[3] Virgen del Castillo
https://sites.google.com/a/iesvirgendelcastillo.es/historia2bachillerato/?_ga=1.131875595.566343537.1444215302
[4] https://plus.google.com/communities/109884545472617380981
[5] http://www.theflippedclassroom.es/quienes-somos/
[6] http://www.theflippedclassroom.es/category/experiencias/ed-primaria/
[7] http://www.eldiario.es/andalucia/cadiz/Lucero_0_475602681.html
[8] https://plus.google.com/communities/108518195697740798126/members

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Romero, M.M.; 2015) and caught on to other similar institutions, like UDIMA (Universidad a Distancia de Madrid) throughout the course of 2015.

UGR, the University of Granada has dedicated forums, such as their annual CAFVIR conference where a sort of online education is discussed and where flipped learning has had a strong presence since its introduction in 2013.

Table 1 tries to summarize the published, peer reviewed, research of implementations of flipped learning in Spain (or in the Spanish speaking research scene that are relevant for the study).

Main Author	Year	Educational level	Field
Azpeleta, C.	2015	HE	Medicine
Baena, V.	2015	HE	Business
Calvo-Centeno, M.E.	2015	HE	Business
Campo-Cabal, J.M.	2015	HE	Law
Castilla, G.	2015	HE	Engineering
Doral-Fábregas, F.	2015	HE	Marketing
Hinojosa-Alcobet, C.	2015	HE	Psychology
Martín-Rodríguez, D.	2015	SE	Teaching
Novillo, A.	2015	HE	Chemistry
Peters, M.J.	2015	HE	Languages
Platero, M.	2015	HE	Business
Rodríguez-Learte, A.	2015	HE	Chemistry
Camacho-Ortega, P.J.	2014	VET	Computer Science
Cerdán-Gómez, F.	2014	HE	Medicine
Coro-Montanet, G.	2014	HE	Medicine
Jordán-Lluch, C.	2014	HE	Engineering
Martí-Parreño, J.	2014	HE	Social Sciences
Martí-Parreño, J.	2014	HE	Social Sciences
Queiro-Ameijeiras, C.	2014	HE	Business
Rodríguez-Learte, A.	2014	HE	Chemistry
Sáez-Pizarro, B.	2014	HE	Chemistry
Sánchez-Moral, A.M.	2014	HE	Chemistry
Sánchez-Camacho, C.	2014	HE	Medicine
Sousa, S.	2014	HE	Social Sciences
Thoilliez, B.	2014	SE	Teaching
Velasco, P. J.	2014	HE	Teaching
Brando-Garrido, C.	2013	HE	Medicine
Rojas, J.Z.	2013	VET	Mathematics
Stetz, T.A.	2013	HE	Teaching
Velasco, P.J.	2013	HE	Teaching

Key:	
HE	Higher Education
VET	Vocational Training
SE	Secondary Education

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Table 1. Summary of research on the topic of flipped Learning in Spain since 2013

Regarding the use of Flipped classroom on Vocational Training, Rojas (2013) lays a first background for vocational training flipped learning experiences in the Spanish language. Although the experience itself took place in Perú, where the UPN (Universidad Privada del Norte), institution that Rojas belongs to, is located.

In Spain the first registered research on this level was covered by Camacho (2014) in computer science (Multiplatform Application Development - MAD) in Universidad Europea de Madrid. Camacho has flipped full courses during the 2013/2014 and 2014/2015 cycles and presented his positive findings in a paper and a workshop during the XI and XII editions of the JIIU conference that took place in Madrid in July of 2014 and 2015. Camacho's experience and the content developed for his courses is openly available in his blog[9].

4. Case studies

4.1. Case study 1

Educational level (primary, secondary, VET, undergraduate, graduate): VET

Knowledge area:

Program name: Development of multiplatform applications

Subject: Databases

Learning option: on-site, blended, online: On-site

Methodology:

Every week (4 weeks):

- Outside the classroom: watch 10-minutes videos
- In classes:
    - Self-assessment tests (40%).
    - Cooperative lab activities defended in each session (60%)

Educational activities:

Self-assessment tests (before classes)

Lab sessions (in class)

Tools, software:

Moodle as educational platform

Camtasia Studio to create the videos

[9] https://pedrojcamacho.wordpress.com

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Microsoft Office to create other resources

Youtube.com to host the videos

Assessment :

- 4 self-assessment test (1 for week): 40% Mandatory to pass.
- 4 cooperative lab sessions in which students have to hand in and show the results to the teacher in class (60 %)

Results:

– High satisfaction (7,5/10)

– Higher grades than in other subjects

Figura 4 – Flipped Classroom

Figura 3 –> Notas de los alumnos (Flipped Classroom)

–> Notas de los alumnos (Media del curso)

Reference: (Camacho Ortega, 2014)

Other comments:

2 academic years applying FC.

Only used in an autonomous part of the syllabus

The results in the first academic year were worse; the teacher thinks that the reason was that the FC model was applied at the end of the subject when they were doing all the exams, and the students were not motivated to prove something new.

Students think would have been of help to have the transcription of the videos or some documentation to complete them.

4.2. Case study 2

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Educational level (primary, secondary, VET, undergraduate, graduate) : Undergraduate

Knowledge area (program name/subject):

Statistics (for Engineers)

Learning option (on-site, blended, online): On-site

Methodology:

– Multimedia content was created and uploaded to a specific Youtube channel called Aula.

– Proposed statistical problems would then have to be solved collaboratively and handed in by the end of the class

Educational activities:

Statistical problems solved collaboratively in classroom

Tools, software:

Youtube (specific channel)

Moodle as Educational Platform

Assessment:

Problems (30%) + Exams (70%)

Results:

- Attendance grew around a 10%.
- Grades grew around 20%.
- Greater self-perception of knowledge was qualitatively perceived.
- Greater long term knowledge persistence was recorded around a 6%.

Reference (website, publication)*:

http://library.iated.org/download/INTED2015TOC

Other comments:

- Some conclusions:
    - Do not flip the whole subject, at least the first time
    - Create specific media contents
    - Greatest resistance: Top students

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4.3. Case study 3

Educational level (primary, secondary, VET, undergraduate, graduate): HE

Knowledge area (program name/subject): Bachelor's Degree in Physiotherapy

Learning option (on-site, blended, online):

Methodology:

– Customized TEDEd lessons with questions and activities to make at home,

– Clinic cases to solve in classroom,

– Twitter for formative assesment

Educational activities:

Questions and activities to solve at home

Collaborative activities to solve in classroom

Tools, software:

Twitter, TEDEd lessons

Moodle as Educational Platform

Assessment:

Results:

Reference (website, publication)*:

http://www.theflippedclassroom.es/la-experiencia-fc-de-pablo-cesar-garcia-profesor-de-fisioterapia-y-mentor-de-la-f-de-c-de-la-salud-uem/

Other comments:

4.4. Case study 4

Educational level (primary, secondary, VET, undergraduate, graduate) : HE

Knowledge area (program name/subject):

Master's Degree in Teacher Training for Secondary School

Learning option (on-site, blended, online): On-site

Methodology:

– Videos and other documents

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– Self-assesment tests about those materials

Educational activities:

– At home before class: Videos and documents, self-assesment tests (Socrative or Educanon)

– Classroom: collaborative activities (infographics, conceptual maps, classroom Project)

– At home after class: reflective portfolio

Tools, software:

Camtasia Studio 8, power point

Socrative, Educanon, Learnist

Moodle and Edmodo as Educational Platform

Mural.Ly, Google drive, CmapTools, EaselY.,PicktoChart, Cacoo, Spycinodes

Assessment:

FL activities (60%): self-assesment tests (10%) + Webquest (15%) + Project (20%) + Portfolio(15%)

Individual exercise: 40%

Results:

- Initial resistance to change the methodology
- Greater participation and motivation (except in the case of the portfolio)
- It requires more time from the teacher
- Students say to need more time too but are satisfied with multiple aspects: interaction with teachers and peers, development of autonomy, continue its own rhythm, participation in decision-making in the learning process
- Students have the self-perception of having increased their learning outcomes.
- Most students prefer FL to traditional methodology

Reference (website, publication)*:

http://dialnet.unirioja.es/servlet/articulo?codigo=5189994

Other comments:

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